REMARKS

These remarks follow the order of the paragraphs of the office action. Relevant portions of the office action are shown indented and italicized.

DETAILED ACTION

Claim Rejections - 35 USC § 103

> *1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:*
> *(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.*
>
> *2. Claim l is rejected under 35 U.S.C. 103(a) as being unpatentable over Varma US 6643322 B1) in view of Mahany (US 5862171) and Mayer (2002/0145976 Al).*

In response, the applicant respectfully states that Claim 1 as not made unpatentable by the inventions of Varma, Mayer and Mayer. The present invention, claimed in Claim 1, provides:

> "an apparatus and method for adapting a transmission parameter in a transmitting node of a data communication system to the current link quality of a data communication channel. The adapted transmission parameter is selected by the transmitting node from a set of transmission parameters in dependence on a number of successful transmissions. The number of successful transmissions is compared in the transmitting node against one of a first threshold value corresponding to a first state of the transmitting node and a second threshold value corresponding to a second state of the transmitting node. The method comprises in the transmitting node the steps of (a) counting the number of successful transmissions; (b) selecting the adapted transmission parameter (bi) in response to the number of successful transmissions equaling or exceeding the first threshold value when the transmitting node is in the first state, and (b2) in response to the number of successful

transmissions equaling or exceeding the second threshold value when the transmitting node is in the second state; and in dependence of the result of a following transmission, operating the transmitting node in one of the first state and the second state.

The method claimed in claim 1 provides for adapting a variable data rate to the link quality, thereby supporting multiple transmission rates and allowing the adaptation of the variable data rate to present channel conditions. Also, a packet length different from the length employed before is used. Moreover, the variable data rate, the different packet lengths, or other parameters can be combined so that several transmission parameters can be adapted to the respective channel conditions.

The cited art to Varma, US Patent 6643322, filed: September 20, 2000, is entitled: "Dynamic wireless link adaptation". The Varma abstract reads:

> "A system that adapts wireless link parameters for a wireless communication link. A measure is determined of errors occurring in communication over a wireless link. In a case that the measure of errors corresponds to more errors than a first predetermined threshold, communication changes from a first set of wireless link parameters to a second set of wireless link parameters. The second set of wireless link parameters corresponds to higher error tolerance than the first set of wireless link parameters. In a case that the measure of errors corresponds to fewer errors than a second predetermined threshold, communication changes from the first set of wireless link parameters to a third set of wireless link parameters. The third set of wireless link parameters corresponds to lower error tolerance than the first set of wireless link parameters. Preferably, the measure of errors is determined by monitoring a number of NACK messages and a number of ACK messages that occur. It is determined that the measure of errors corresponds to more errors than the first predetermined threshold when more than a predetermined number of NACK messages occur in succession. It is determined that the measure of errors corresponds to fewer errors than the second predetermined threshold when more than a predetermined number of ACK messages occur in succession".

Thus, Varma is directed to adapting wireless link parameters for a wireless communication link. Varma, is not concerned with adapting a variable data rate to the link quality, or a change of

packet length different to the length employed before can be used, and certainly not a combination of these

The further cited art to Mahany, US Patent 5862171, filed: June 6, 1995, is entitled: "Radio frequency communication network having adaptive communication parameters". The Mahany abstract reads:

> "A radio communication network includes at least one mobile transceiver unit in communication with at least one base transceiver unit that facilitates communicate with at least one host computer for storage and manipulation of data collected by bar code scanners or other data collectors associated with the mobile transceiver units. The radio network implemented by the mobile transceivers and base transceivers adapts to compensate for the wide range of operating conditions by adjusting its operating parameters. Such operating parameters include: the length and frequency of spreading codes employed in direct-sequence spread spectrum communications; hop frame lengths, coding and interleaving in frequency-hopping spread spectrum communications; the method of source encoding used; and the data packet size in a data segmentation communication scheme. The base transceiver is responsive to information contained within transmissions received from the mobile transceiver units in establishing data packet sizes as well as to the transmissions themselves. The base transceiver is also responsive to the quality of transmissions received from the mobile transceiver units in determining whether to modify current data packet sizes.".

Thus, Mahany is directed to a radio communication network to facilitate communicate with at least one host computer for storage and manipulation of data collected by bar code scanners or other data collectors associated with the mobile transceiver units. This fails to support the deficiencies of Varma to make claim 1 obvious.

The cited art to Mayer, US Patent 2002/0145976, filed: April 1, 2002, is entitled: "Data flow control method". The Mayer abstract reads:

> "A method of controlling the flow of an amount of data from a sending peer to a receiving peer of a predetermined communication protocol is described. The method

comprises dividing the amount of data into a plurality of data segments, where the data segments are ordered in a sequence. The segments are sent to the receiving peer in the order of said sequence. The receiving peer acknowledges the correct receipt of a data segment and identifies the last correctly received data segment of the sequence that was received in the proper order of the sequence. The sending peer is arranged such that if it receives a threshold number of duplicate acknowledgments, it performs a retransmission. The threshold number that trigger a retransmission is an adaptive parameter and may assume values larger than three".

Thus, Mayer is directed to controlling the flow of an amount of data from a sending peer to a receiving peer of a predetermined communication protocol. This fails to support the deficiencies of Varma and Mayer to make claim 1 obvious.

Furthermore, there is apparently no reason for one skilled in the art to combine Varma, in U.S. Class 375/227 directed to adapting wireless link parameters for a wireless communication link, with Mahany in U.S. Class 375/200 directed to a radio communication network to facilitate communicate with at least one host computer for storage and manipulation of data collected by bar code scanners or other data collectors associated with the mobile transceiver units, and with Mayer in U.S. Class 370/235 directed to controlling the flow of an amount of data from a sending peer to a receiving peer of a predetermined communication protocol. The office communication is apparently using hindsight to find an alleged combination to have all the elements of claim 1. This is not allowed in a 103 obviousness rejection.

Furthermore, none of the references apparently cites another of the references, as required in a 103 rejection.

Furthermore, the 3 way combination fails in teaching the elements of claim 1, and claim 1 is allowable over the combined references.

> *3. As per claim 1, Varma teaches a method for adapting a transmission parameter in a transmitting node of a data communication system (Varma, Col 1 L52-53, Fig. 1 item 1) to the current link quality of a data communication channel (Varma, Col 1 L24-28) the adapted transmission parameter (Varma, Col 1 L18-22) being selected by the*

transmitting node from a set of transmission parameters (Varma, Col 2 L40-42) in dependence on a number of successful transmissions (Varma, Fig. 5 itme S5O1), the number of successful transmissions being compared (Varma, Fig. 5 itme S501) in the transmitting node against one of a first value corresponding to a first state of the transmitting node and a second value corresponding to a second state of the transmitting node, the method comprising in the transmitting node the steps of (Varma, Col 1 L55-58 — Two set of parameters have been used the first set for first state and second set for second state.): counting the number of successful transmissions (Varma, Fig. 5 item S502, Abstract [15-17 "determined by monitoring ... a number of ACK messages that occur"); selecting the adapted transmission parameter (Varma, Col 2 [40-42) in response to the number of successful transmissions equaling or exceeding the first value when the transmitting node is in the first state (Varma, Col 6 [36-41, Fig. 4, Fig. 5) and in response to the number of successful transmissions equaling or exceedingt he second value when the transmitting node is in the second state (Varma,Col 6 L30-35, Fig. 4, Fig. 5); and in dependence of the success or failure of a subsequent transmission, operating the transmitting node in one of the first state and the second stare (Varma, Col 7 L16-18), wherein the step of operating the transmitting node in the second state further comprises in the event of a faulty transmission transitioning to the first stare, and further comprising (Varma, Abstract, Fig. 4, Fig. 5): setting the first value (Varma, Abstract "first predetermined threshold") to 3 (not in Varma but would have been obvious as explained below) and the second value (Varma, Col 5 [45-55 "second threshold") to 10 (not in Varma but would have been obvious as explained below); counting a number of faulty transmissions and selecting the adapted transmission parameter in dependence of a threshold of the number of faulty transmissions (Varma, Fig. 5 item S5O1, Abstract "determined by monitoring a number of NACK messages ... that occur 1);

setting the threshold or the number faulty transmissions (Varma, Fig. 5 item S501) to 1; and selecting the transmission parameter used by a responding receiver (Varma, Col 2 L40-42, Fig. 1 item 2, Col 3 L33-43); wherein the step of selecting the adapted transmission parameter further comprises selecting a different data rate , and (Varma, Col 1 L18-22) wherein the step of selecting the adapted transmission parameter further comprises selecting a packet length different to the length used before (not in Varma but would have been obvious as explained below).

In response, the applicants respectfully state that exception is taken with the alleged teaching of the elements of claim 1 by Varma. Claim 1 as amended reads:

1. An adaptation method comprising adapting a transmission parameter in a transmitting node of a data communication system to a current link quality of a data communication channel the transmission parameter being selected by the transmitting node from a set of transmission parameters in dependence on a number of successful transmissions, the number of successful transmissions being compared in the transmitting node against one

of a first value corresponding to a first state of the transmitting node and a second value corresponding to a second state of the transmitting node, the step of adapting comprising in the transmitting node the steps of:

adapting a variable data rate to the current link quality and supporting multiple transmission rates;

counting the number of successful transmissions;

selecting and switching to the adapted transmission parameter by switching to a different data rate allowing adaptation of the variable data rate to present channel conditions;

in response to the number of successful transmissions equaling or exceeding the first value when the transmitting node is in the first state and

in response to the number of successful transmissions equaling or exceeding the second value when the transmitting node is in the second state; and

in dependence of the success or failure of a subsequent transmission, operating the transmitting node in one of the first state and the second state,

wherein the step of operating the transmitting node in the second state further comprises in the event of a faulty transmission transitioning to the first state, and further comprising:

setting the first value to 3 and the second value to 10;

counting a number of faulty transmissions and selecting the adapted transmission parameter in dependence of a threshold of the number of faulty transmissions;

setting the threshold or the number of faulty transmissions to 1; and

selecting the transmission parameter used by a responding receiver;

wherein the step of selecting the adapted transmission parameter further comprises selecting a different data rate, and

wherein the step of selecting the adapted transmission parameter further comprises selecting a new packet length different from an original packet length being used.

In order to better protect the present invention, the preamble is shortened and material in the preamble that may have been overlooked by the Examiner is amended to be after the word comprising. This provides patentable weight to this material.

Also, the language of the limitation of "selecting a new packet length different from an original packet length being used," is improved.

Also, a step of 'adapting a variable data rate to the current link quality and supporting multiple transmission rates', is added to more directly claim the invention, and important novelty. Nowhere in Varma, or the other references is there any concern for adapting a variable data rate, and certainly not in combination with a changed packet length. Cited portions of the reference are copied below to show the lack of support of some of the alleged elements.

The cited Varma portion col 1 L52-53 reads:

> One embodiment of the present invention that addresses the foregoing need is a method of dynamically adapting wireless link parameters. A measure is determined of errors occurring in communication over a wireless link.

There is has no showing of any concern for adapting a variable data rate, and certainly not in combination with a changed packet length.

The cited Varma portion col 1 L24-28 reads:

> Conventional wireless communication systems adapt their modulation schemes based on periodic measurements of channel quality. A measurement of channel quality used by

these systems is a bit error rate (BER) statistic. These conventional systems have several drawbacks.

This actually shows Varma, teaching away from error rate used in claim 1.

The cited Varma portion col 1 L18-22 reads:

This invention relates to dynamic adaptation of link parameters for wireless communication. In particular, the invention relates to dynamic adaptation of link parameters such as modulation scheme, symbol rate, and error correction scheme for a wireless communication link.

The cited Varma portion col 2 L40-42 reads:

An optimal set of parameters tends to be automatically selected for a given error rate by using theses intersections as thresholds for changing between sets of parameters.

The cited Varma portion col 1 L55-58 reads:

In a case that the measure of errors corresponds to more errors than a first predetermined threshold, communication changes from a first set of wireless link parameters to a second set of wireless link parameters.

The cited Varma portion col 6 L36-41 reads:

In step S502, a number of successively received and/or generated ACK messages is compared to a threshold. If this number of ACK messages exceeds the threshold (or alternatively equals or exceeds the threshold), then it is determined that less errors than the second predetermined threshold have occurred.

The cited Varma portion col 6 L30-35 reads:

Thus, in step S501, a number of successively received and/or generated NACK messages is compared to a threshold. If this number of NACK messages exceeds the threshold (or alternatively equals or exceeds the threshold), then it is determined that more errors than the first predetermined threshold have occurred.

The cited Varma portion col 7 L16-18 reads:

Because the foregoing operations utilize NACK and ACK messages to trigger state changes, wireless link parameters react dynamically.

The cited Varma portion col 5 L45-55 reads:

In more detail, a measure or measures are determined in step S401 of errors occurring in communication over a wireless link. This measure can be generated by a receiving device, a sending device, or both. In step S402, this measure is compared to thresholds. If the measure indicates that more errors than a first threshold have occurred, then flow proceeds to step S403. If the measure indicates that less errors than a second threshold have occurred, then flow proceeds to step S404. Otherwise, flow returns to step S401. A preferred method for implementing steps S401 and S402 is described below with respect to FIG. 5.

The cited Varma portion col 3 L33-43 reads:

FIG. 1 is a block diagram of a wireless communication link. Shown in FIG. 1 are transmitter 1 in communication with receiver 2 over wireless link 3. Examples of the arrangement shown in FIG. 1 include, but are not limited to, cellular phone communication, wireless cable services, multipoint multichannel distribution services (MMDS), and any other wireless communication. The invention is equally applicable to one-way communication, two-way communication, and any other types of wireless communication. A single device can be a transmitter, a receiver, or both for wireless communication according to the invention.

In response, the applicants respectfully state that indeed the above portions fail to teach all the elements of claim 1, as partially admitted below.

4. Varma does not teach wherein the step of selecting the adapted transmission parameter further comprises selecting a packer length different to the length used before. Mahany teaches wherein the step of selecting the adapted transmission parameter further comprises selecting a packet length different to the length used before (Mahany, Abstract [19-21 "determining weather to modify current packet sizes"). Thus, it would have been obvious, to one of ordinary skill in the art, at the time the invention was made, to arrive at wherein the step of selecting the adapted transmission parameter further comprises selecting a packet length different to the length used before as recited by the instant

claim. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Varma with Mahany because Varma teaches and suggests selecting different dynamic adaptation link parameters such as modulation scheme, symbol rate, error correction scheme and the like based on the channel (link) quality measurement for better throughput efficiency (Varma, Col 1 L18-22, L29-34, Abstract, Col 5 [16-26) and Mahany teaches and suggests the benefit of using communication link adaptive parameters such as to determine whether to modify current data packet sizes based on the channel (link) quality measurement for better quality of transmission or throughput efficiency in the analogous art of communication system, particularly in adaptation of link parameters (Mahany, Abstract).

In response, the applicants respectfully state that exception is taken with the alleged teaching of this element of claim 1 by Varma with even with Mayer.

The cited Varma portion col 1 L18-22 reads as stated above.

The cited Varma portion col 1 L29-34 reads:

> First, different modulation schemes can have radically different throughput efficiencies and error tolerances. As a result, a change in modulation schemes to accommodate an increase in communication errors can result in an unacceptable decrease in throughput efficiency.

The cited Varma portion col 5 L16-26 reads:

> Of course, the invention is equally applicable to different sets and different orderings of wireless link parameters. These different sets can include some, none, or all of the wireless link parameters discussed above, as well as other wireless link parameters. For example, the parameters can include different modulation schemes and variations on those modulation schemes (e.g., 16QAM vs. 64QAM), different symbol rates and encodings, different error correction schemes, and the like. Furthermore, the invention is not limited to eight sets of wireless link parameters. Any number of different sets of wireless link parameters may be utilized

If Varma, would have been concerned with the packet size. Varma, should have and would have stated that much. Varma, never considered packet size or variable rate transmission, and certainly not combining adapting to both.

Mayer being directed to a radio communication network to facilitate communicate with at least one host computer for storage and manipulation of data collected by bar code scanners or other data collectors associated with the mobile transceiver units, would not be a source of teaching packet length changing for any adaptation method. Meyer's problems and use of packet size is related to 'data collection' and 'bar codes'. Both are a far cry from any adaptation method. No one skilled in the art would think of combining the two very different technology needs and innovations.

> *5. Varma in view of Mahany does not teach to 3, to 10, to 1. Mayer teaches to 3, to 10 (Mayer, para [0015], [0011], [0012], Abstract), to 1(Mayer, Fig. 1 item 52). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to implement the teachings of Mayer into Varma in view of Mahany since Varma in view of Mahany teaches dynamic link adaptation based on comparing the number of ACK or NACK received from a receiver with a threshold value to measure the link quality for a better throughput efficiency and Mayer teaches the beneficial use of setting the threshold value related to successful ACK larger than three and also comparing acknowledgment failure to one to achieve such as a more accurate link quality measurement result in order to adapt the correct link parameters to control the flow of data between transmitter and receiver (Mayer, Abstract, para [0015], [0011], [0012])*

In response, the applicants respectfully state that exception is taken with the alleged teaching of this element of claim 1 by Varma with even with Mayer. Neither teach a setting of a first value corresponding to a first state of any transmitting node, and a second value corresponding to a second state of the transmitting node. There is certainly no allusion of setting the first value to 3 and the second value to 10. Although Mayer uses the word 'THREE' in the portion copied below. Nowhere does the office communication even allege a setting of any second value to 10.

The cited Mayer portion para [0011] reads:

> [0011] All such mechanisms as described above for receiving an indication that a data unit has been lost, suffer from the problem that the sending peer only receives an indirect

indication that a data unit was lost, and in fact the occurrence of the predetermined triggering event (a time-out or a predetermined number of duplicate acknowledgements) does not necessarily mean that a data unit was really lost. These triggering events can also be caused spuriously, e.g. if a data unit is delayed in the transmission network, while data units associated with segments further on in the sequence are delivered by the network. Such a phenomenon is also referred to as reordering.

The cited Mayer portion para [0012] reads:

[0012] In "EFR: A Retransmit Scheme for TCP in Wireless LANs" by Yosuke Tamura, Yoshito Tobe and Hideyuki Tokuda, XP-002115028, a new retransmission scheme is proposed. This paper addresses the problem that occurs when a send window is small, such that when a segment is lost, the receiver will not sénd the three duplicate acknowledgments needed for triggering a fast retransmit, because the number of segments being sent is too small. In this case a fast retransmission is not possible and the sender will wait until a retransmission time-out occurs. As a solution to this situation, it is proposed that when receiving the first duplicate acknowledgment, the sender calculates the value of the duplicate acknowledgment threshold in dependence on the send window size. The algorithm first converts the value of the send window, which is given in byte, into a value reflecting a number of segments, by dividing the window size by a maximum segment size. Then two is subtracted from the result, in order to determine the duplicate acknowledgment threshold. If the calculated threshold value is larger than three, then the threshold is automatically set to three. Therefore, the value of the duplicate acknowledgment threshold is set to one, two or at most three.

Mayer addresses the problem that occurs when a send window is small, such that when a segment is lost, the receiver will not send the three duplicate acknowledgments needed for triggering a fast retransmit, because the number of segments being sent is too small. In Mayer's problem a high number is desirable, and Mayer teaches away from 3. Mayer certainly does not talk about or teach setting any first value to 3 and any second value to 10.

The cited Mayer portion para [0015] reads:

[0015] In accordance with the present invention, in a system where the receipt of a predetermined number of duplicate acknowledgement messages triggers the

> retransmission of a data segment that follows the data segment identified in the duplicate acknowledgement, it is proposed to arrange that this predetermined number is an adaptive parameter that may assume values larger than three. This means that the duplicate acknowledgment threshold is a parameter that is adaptable to the general conditions surrounding the sending of data segments, e.g. the conditions of the sending peer, the transmission conditions (as for example determined by the link over which the segments are being sent, or generally by the transmission network over which the segments are being sent), or the conditions of the receiving peer.

A review of all these fails to show the alleged teaching or a finding of obviousness. The office communication ignores the limitation, "setting the threshold or the number of faulty transmissions to 1."

Applicants respectfully state that it is shown that the elements of claim 1 are not taught separately or even by the combination of the three disparate references, each of which being directed to a very distinct and different technology problem. Thus, claim 1 is not made obvious and is allowable.

If any question remains, please contact the undersigned, before issuing any FINAL office communication.

Please charge any fee necessary to enter this paper to deposit account 50-0510.

Respectfully submitted,

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